UNIQUE ITEM IDENTIFICATION (UID)

Data Conversion

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Agenda

- Educate people as to how bar code scanners actually convert code into data.
- Discussion of alternative methods of data conversion

Definitions/Concepts

- Scanner – Optically reads bar code or 2D symbol
- Scanner buffer – Temporary holding area for data stream from a successful scan
- Software wedge – Program that resides on the scanner, Terminal or PC that can be configured to convert data, parse and process data in a preset manner
  - Sometimes called scanner wedge when it resides on the scanner
- Data stream – Stream of characters that include syntax and semantics as well as data
- Parse – The process of:
  - separating concatenated data into discrete data elements;

  or
  - putting data from a data stream in the appropriate data field in a database

What is Conversion

- Changing the data stream format or presentation to the AIS
- Makes the data format compatible with what the receiving AIS expects or demands to see
- Supports legacy AIS inputs
- Conversion does not equal parsing

examples
A01N35W4085011234567
Becomes
A01 ^ N35 ^ W ^ 4085011234567 ^

Conversion Assumptions

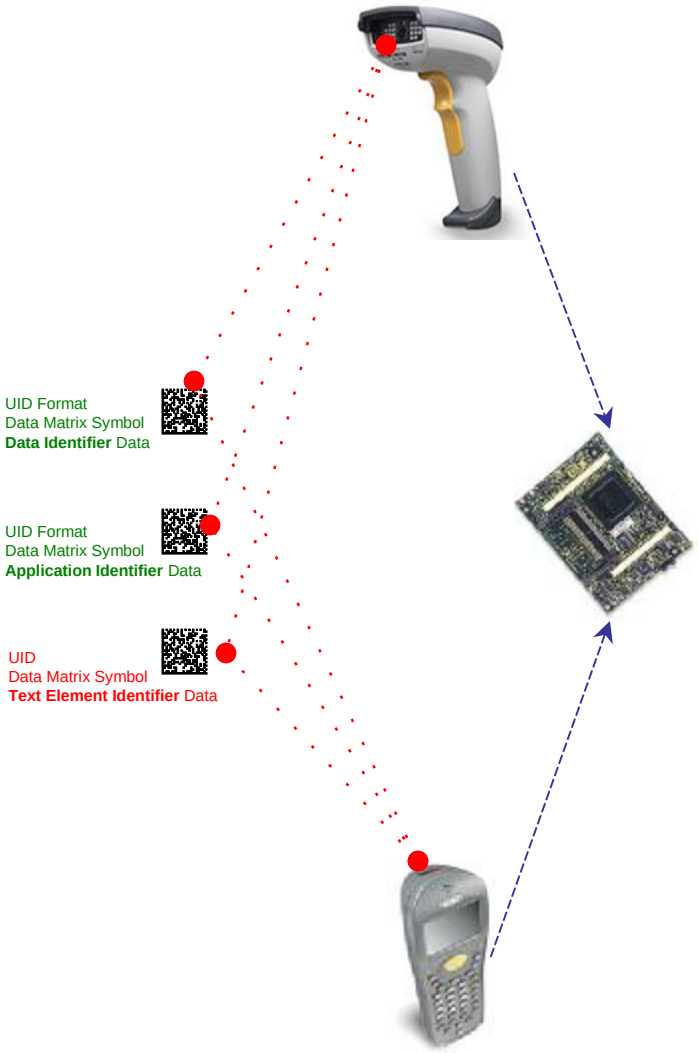
- **Data stream is recognizable**
  - **Initiation character/string**
- **Data stream is Unambiguous**

- **Input data format must be unambiguous in an open system environment**
  - **ISO/IEC 15434**

Data Integrity/Validity Reality

- **System administrators grossly underestimate the expense of:**
  - **Error identification**
  - **Error correction**
  - **Causative research**
  - **Loss of data base creditability**
- Cannot afford to present <u>any</u> ambiguous data to the data base

How Do Scanners Work?



DI
0011000100110111
0101011000110001
0101000001010011

AI
0011000000110001
0011001000110001
0011100000110000
0011000000110011

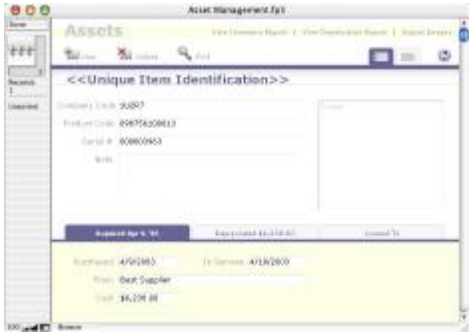
TEI
0100001101000001
0100011101010011
0100010101010010
0101000001001110
01010010

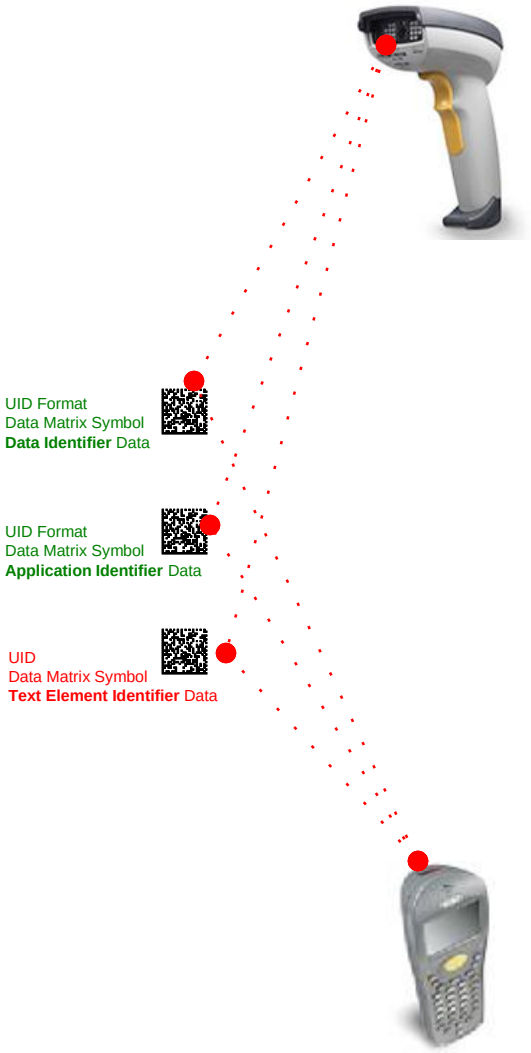
||

DI
17V <data1>
1P <data2>
S <data3>

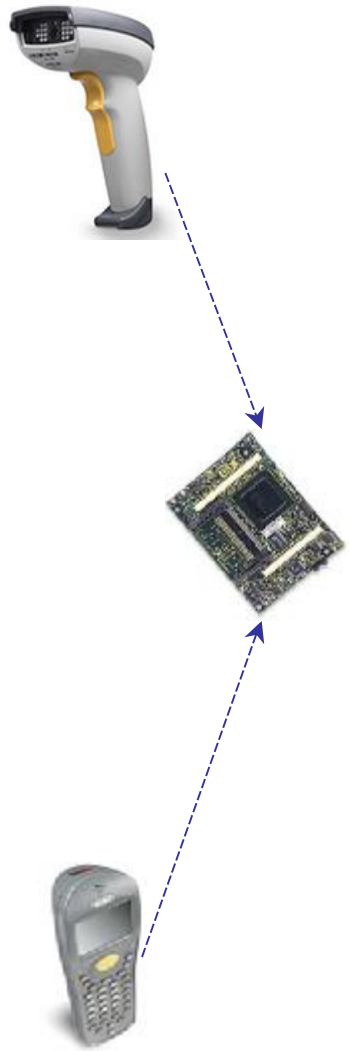
AI
01 <data1>, <data2>
21 <data3>
8004 <data1>, <data2>, <data3>

TEI
MFR <data1>
PNR <data2>
SER <data3>





- The scanner does not care about the format of the data
- The scanner is able to image the symbol and then pass the information to the decoder and processor logic



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- The internal decoder and processing logic determines which symbology
- The internal processing logic determines whether the syntax is known
- The internal processing logic determines whether the semantics is known
  - Fielded terminals currently read Data Identifiers and Application Identifiers and would have to be modified to read Text Element Identifiers

- The internal processing logic parses the data to find the syntactic separators, headers, and trailers, “identifiers” and the “data”
- The host database does not include the “identifiers”
- The host database only includes the “data”
- The internal processing logic sends the data to the database formatted as a specific file format or to the front end of the database to be processed into the host’s file format

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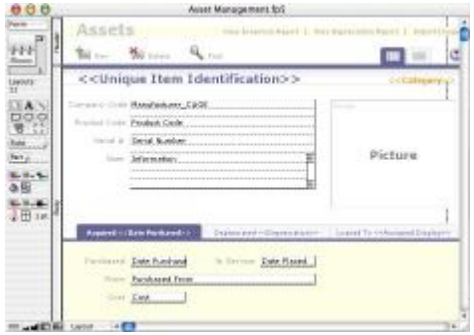

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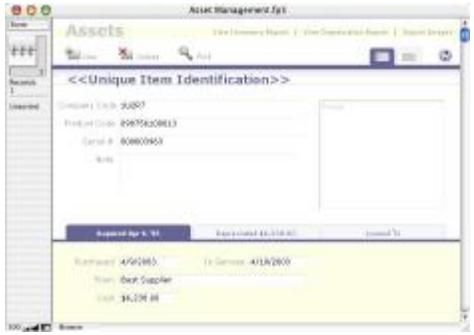

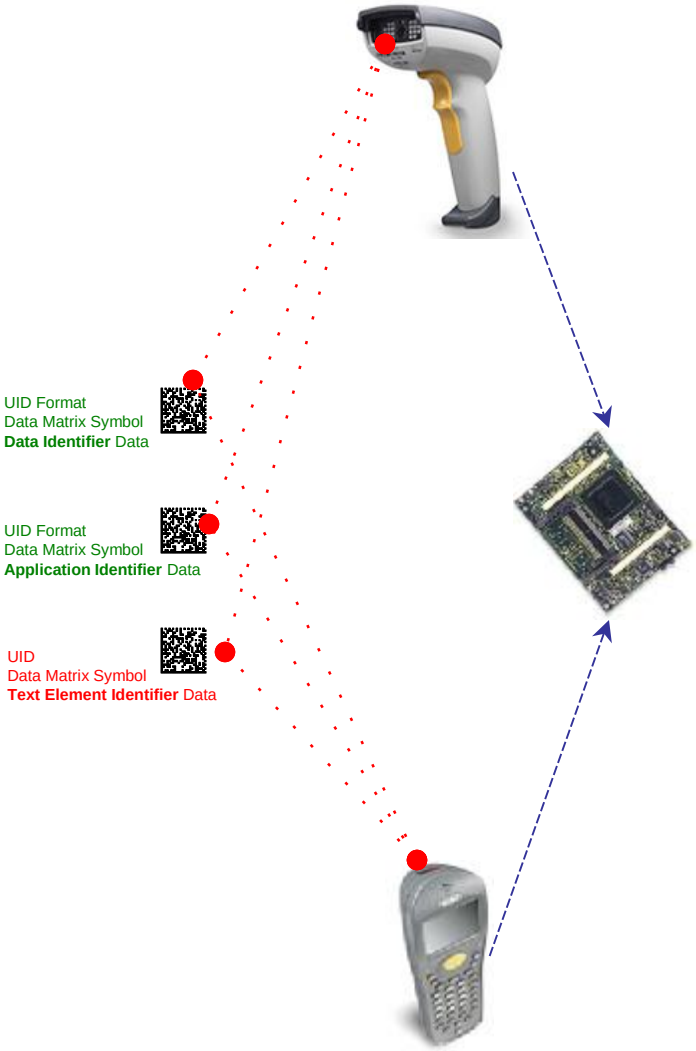

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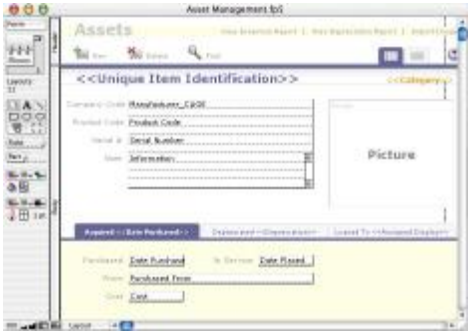

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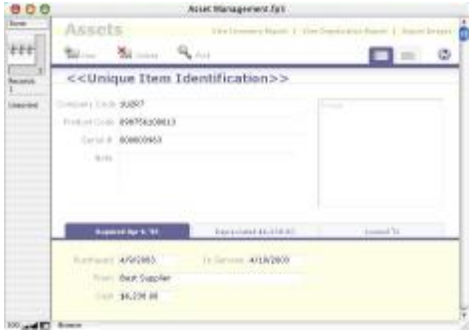

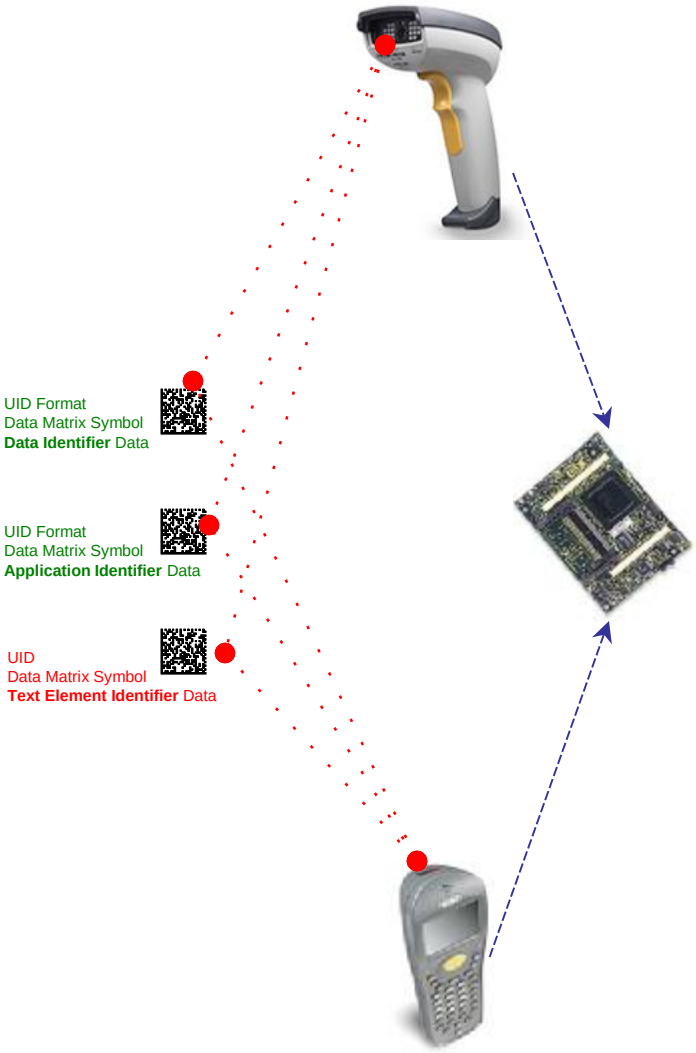

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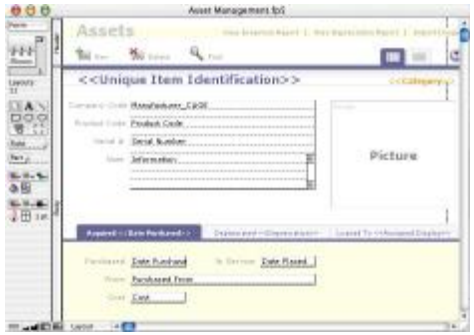

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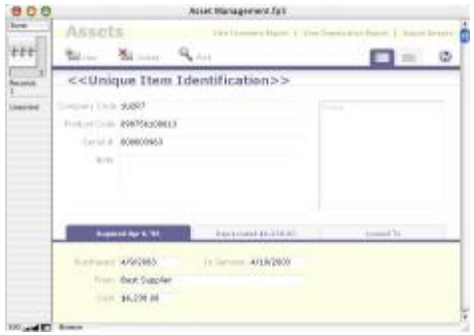

Methods of Conversion

- Scan Without Conversion
  - Read/parse data without changing format
- Scanning With Conversion/ Software Wedge On Scanner
  - Read/Convert data using software wedge on scanner
- Scanning With Conversion/ Software Wedge on PC
  - Read/Convert data using software wedge on PC
- Scanning With Conversion/ Application Software Conversion
  - Read/convert data in the application software

Scanning Without Conversion to PC

- Read Symbol
- Bring data stream into scanner buffer
- Buffer transmit data stream through RS232 (or other connection) to serial port on PC (or other port)
- Application takes data stream into application
  - Application parses DIs, AIs, TEIs to appropriate data field in database

Scanning With Conversion/ Software Wedge On Scanner

- Read Symbol
- Bring data stream into scanner buffer
- Software wedge reads scanner buffer
  - Converts data to desired format
  - Creates new data stream in desired format
- Software wedge transmit new data stream through RS232 (or other connection) to serial port on PC (or other connection)
- Application takes new data stream into application
  - Application parses DIs, AIs, TEIs to appropriate data field in database

Scanning With Conversion/ Software Wedge on PC

- Read Symbol
- Bring data stream into scanner buffer
- Scanner buffer transmits data stream through RS232 (or other connection) to serial port on PC (or other connection)
- Software wedge on PC reads data stream
  - Converts data to desired format
  - Creates new data stream in desired format
- Software wedge transfers new data stream to application on PC
- Application takes new data stream into application
  - Application parses DIs, AIs, TEIs to appropriate data fields in database

Scanning With Conversion/ Application Software Conversion

- Read Symbol
- Bring data stream into scanner buffer
- Buffer transmit scan through RS232 (or other connection) to serial port on PC
- Application takes data stream into application
  - Converts data to desired format
  - Application parses DIs, AIs, TEIs to appropriate data fields in database

Option Comparison

Method	Availability	Cost	Remarks
No conversion	Yes	None	Legacy
Scanner Software Wedge	Yes	Part of Scanner/lower than PC Wedge or Application conversion	Configuration required
Scanner Software PC	Yes	Licensed by PC/Lower than Application Conversion	Configuration required
Application	Yes	Unknown	Difficult to standardize

Conclusion

- There are many ways to mitigate cost risks to an application
- There are many ways to convert formats on the fly
- Number of scanners, terminals effect total cost of conversion
- Application conversion is the least desirable because of multiple approaches and non-standardization

Standardization vs. Cost

- Standardization and interoperability are maximized with conversion in scanner
  - Total cost directly proportional to scanner population
- Cost may minimized with conversion at application with older scanners that cannot be converted